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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,870	12/24/2003	Yuji Yasui	108419-00055	9352

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EXAMINER

TRAN, BINH Q

ART UNIT	PAPER NUMBER
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3748

DATE MAILED: 06/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/743,870	Applicant(s) YASUI ET AL.	
	Examiner BINH Q. TRAN	Art Unit 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 March 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,7-9,11 and 12 is/are rejected.
- 7) ☒ Claim(s) 2,6 and 10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

This office action is in response to the amendment filed March 23, 2006.

#### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

*Claims 1, 3-5, 7-9, and 11-12 are rejected under 35 U.S.C. 102 (e) as being anticipated by Xu et al. (Xu) (Patent Number 6,427,439).*

Regarding claims 1, 5, and 9, Xu discloses an exhaust gas purifying apparatus for an internal combustion engine (10) comprising: a NOx selective reduction catalyst (20) disposed in

Art Unit: 3748

an exhaust passage of said internal combustion engine for purifying NOx in exhaust gases flowing through said exhaust passage under the existence of a reducing agent; a NOx detector (28) disposed in said exhaust pipe at a location downstream of said NOx selective reduction catalyst for detecting a NOx concentration in exhaust gases; a reducing agent supply unit (e.g. 16, 22, 24) for supplying the reducing agent to said NOx selective reduction catalyst; and supply amount determining means (e.g. 12, 22, 24) for determining the amount of the reducing agent supplied to said NOx selective reduction catalyst by said reducing agent supply unit such that the NOx concentration detected by said NOx detector reaches an extreme value (e.g. See Figs. 2-7; col. 4, lines 4-67; and col. 5, lines 1-26).

*It is examiner official notice that the “extreme value” is value from zero to infinity ( $0 \rightarrow \infty$ ).*

Regarding claims 3, 7, and 11, Xu further discloses a reducing agent production unit for producing the reducing agent using at least a fuel for said internal combustion engine as a raw material (e.g. See Figs. 2-7; col. 3, lines 11-67; col. 4, lines 1-67; col. 5, lines 1-26).

Regarding claims 4, 8, and 12, Xu further discloses that the reducing agent is ammonia (e.g. See Figs. 2-7; col. 3, lines 11-67; col. 4, lines 1-67; col. 5, lines 1-26).

*Claims 1, 3-5, 7-9, and 11-12 are rejected under 35 U.S.C. 102 (e) as being anticipated by Kawai et al. (Kawai) (Patent Number 6,755,014).*

Regarding claims 1, 5, and 9, Kawai discloses an exhaust gas purifying apparatus for an internal combustion engine (1) comprising: a NOx selective reduction catalyst (17) disposed in an exhaust passage of said internal combustion engine for purifying NOx in exhaust gases

Art Unit: 3748

flowing through said exhaust passage under the existence of a reducing agent; a NOx detector (26) disposed in said exhaust pipe at a location downstream of said NOx selective reduction catalyst for detecting a NOx concentration in exhaust gases; a reducing agent supply unit (e.g. 18, 29, 37) for supplying the reducing agent to said NOx selective reduction catalyst; and supply amount determining means (e.g. 46) for determining the amount of the reducing agent supplied to said NOx selective reduction catalyst by said reducing agent supply unit such that the NOx concentration detected by said NOx detector reaches an extreme value (e.g. See Figs. 1-9; col. 5, lines 32-67; cols. 6-7, lines 1-67; col. 8, lines 1-38).

Regarding claims 3, 7, and 11, Kawai further discloses a reducing agent production unit for producing the reducing agent using at least a fuel for said internal combustion engine as a raw material (e.g. See Figs. 1-9; col. 5, lines 32-67; cols. 6-7, lines 1-67; col. 8, lines 1-38).

Regarding claims 4, 8, and 12, Kawai further discloses that the reducing agent is ammonia (e.g. See Figs. 1-9; col. 5, lines 32-67; cols. 6-7, lines 1-67; col. 8, lines 1-38).

*It is examiner official notice that the “Extreme Value” is a value from Zero to Infinity ( $0 \rightarrow \infty$ ).*

#### ***Allowable Subject Matter***

Claims 2, 6, and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Since allowable subject matter has been indicated, applicant is encouraged to submit formal drawings in response to this Office action. The early submission of formal drawings will permit the

Art Unit: 3748

Office to review the drawings for acceptability and to resolve any informalities remaining therein before the application is passed to issue. This will avoid possible delays in the issue process.

### ***Response to Arguments***

Applicant's arguments filed March 23, 2006 have been fully considered but they are not completely persuasive. ***Claims 1-12 are pending.***

Applicant's cooperation in explaining the claims subject matter more specific to overcome the claim rejection is appreciated.

Applicants have argued that any one of Xu and Kawai et al. do not teach or suggest Applicant's claimed invention. More specifically, Applicants assert that the reference to both Xu and Kawai fail to disclose "*supply amount determining means for determining the amount of the reducing agent supplied to said NOx selective reduction catalyst by said reducing agent supply unit such that the NOx concentration detected by said NOx detector reaches an extreme value*". The examiner respectfully disagrees, in column 4, lines 4-67; and column 5, lines 1-26, Xu has clearly disclosed that "... *The method depicted in FIG. 3 includes the additional steps of determining, in block 32a, the NOx concentration values [NOx ] obtained from NOx sensor 28, and a NOx conversion value NCC determined as follows:  $NCC = 1 - ([NOx ]/[NOx C])$ . Also, if [NOx C] is greater than the threshold A, further steps include checking, at decision block 50, whether the NOx conversion value NCC exceeds a threshold value C(T) which varies with catalyst temperature. If so, then the injection rate is reduced the next time through the loop by decreasing R, as indicated in block 52 where R is multiplied by a predetermined factor RN that is preferably between 0.5 and 1. On the other hand, if NCC is less than or equal to C(T), then the*

Art Unit: 3748

*injection rate is increased the next time through the loop by increasing  $R$ , as indicated in block 53 where  $R$  is multiplied by a predetermined factor  $RP$  that is preferably between 1 and 2. Thus, data from the optional NOx sensor is used to adjust the reductant injection rate to save reductant when the NOx conversion is above temperature dependent threshold value  $C(T)$  and the calculated NOx concentration is greater than a threshold value  $A$ . .... The FIG. 5 logic is the essentially the same as that followed in FIG. 2. Also, if  $[NOx\ C]$  is not greater than the threshold  $A$ , as determined in block 34, and  $[NH_3]$  is equal to or greater than a threshold value  $B$  where ammonia slip occurs, as determined in block 56, then the reductant amount  $q$  is reduced at block 58 by an amount  $q.sub.0$  at block 58 so that the next time through the loop the amount injected at block 38 will be reduced. .... ". It is clearly that Xu has disclosed supply amount determining means (e.g. 12) for determining the amount of the reducing agent supplied to said NOx selective reduction catalyst by said reducing agent supply unit (16) such that the NOx concentration detected by said NOx detector (28) reaches an extreme value. It is well understood that the "Threshold Value" is an extreme value.*

In addition, in column 5, lines 33-67; and column 7, lines 1-26, Kawai has also disclosed that "Next, NOx control processings by the NOx cleaning apparatus will be explained in accordance with a NOx cleaning processing routine of FIG. 2. ... (17) The exhaust gas control apparatus 4 repeats a NOx cleaning processing control of the NOx cleaning processing routine of FIG. 2 simultaneous with ON of an engine key at every predetermined control cycle. The exhaust gas control apparatus 4 confirms key ON at step R1 and inputs data of the catalyst temperature  $T_g$ , the exhaust gas flow rate  $G$ , the NOx concentrations  $S_{noxf}$ ,  $S_{noxr}$ , the adsorption amount  $SNH_3\ (n-1)$  at a preceding time and the like at step R2. .... At step R3, the

Art Unit: 3748

*exhaust gas control apparatus 4 respectively calculates the NOx mass flow rate  $U_{NOx}$  by using the exhaust gas flow rate  $G$  and the NOx concentration  $S_{NOxf}$  and the actual NOx cleaning rate  $\eta$  by using the NOx concentrations  $S_{NOxf}$ ,  $S_{NOxr}$ , calculates the basic addition amount  $DNH_3$  of ammonia as an amount of ammonia to be adsorbed newly to the NOx catalyst 17 based on the catalyst temperature  $T_g$ , calculates the target adsorption amount  $MNH_3$  in correspondence with the catalyst temperature  $T_g$  from the map constituting the target adsorption amount setting means 47 and proceeds to step R4. At step R4, the exhaust gas control apparatus 4 derives the consumption amount  $f(\eta, U_{NOx})$  based on the NOx mass flow rate  $U_{NOx}$  and the actual NOx cleaning rate  $\eta$  and calculates to derive the actual adsorption amount  $S.NH_3(\eta)$  of ammonia by using Equation (4) at step R5. ... Next, NOx control processings by the NOx cleaning apparatus according to the second embodiment will be explained in accordance with a NOx cleaning processing routine of FIG. 6".* It is clearly that Kawai has disclosed supply amount determining means for determining the amount of the reducing agent supplied to said NOx selective reduction catalyst by said reducing agent supply unit such that the NOx concentration detected by said NOx detector reaches an extreme value.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be



Art Unit: 3748

calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Binh Tran whose telephone number is (571) 272-4865. The examiner can normally be reached on Monday-Friday from 8:00 a.m. to 4:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reach on (571) 272-4859. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BT  
June 08, 2006



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Patent Examiner  
Art Unit 3748